

Appendix

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A. Grassland

Both native and non-native grasslands occur within the City. There are approximately 1,807 acres of grasslands within Carlsbad.

1. Native Grassland

Native grassland is characterized by perennial bunch grasses such as needlegrass (*Nassella*) and herbaceous annuals and perennials such as Cleveland's shooting star (*Dodecatheon clevelandii*), blue-eyed grass (*Sisyrinchium bellum*), fascicled tarweed (*Hemizonia fasciculatum*), sanicles (*Sanicula* spp.), and mariposa lily (*Calochortus* spp.). This habitat type is often associated with clay soils and frequently occurs as open patches within coastal sage scrub.

Under California regulations and policies, native grassland is considered a sensitive habitat. This status reflects its limited distribution, potential to support sensitive plant species, use as raptor foraging habitat, and continuing decline as a result of development and agricultural activities. Areas with at least 10% cover of *Nassella pulchra* or *N. lepida* are identified in the California Natural Diversity Data Base (CNDDB) as priority areas for monitoring and restoration efforts.

In Carlsbad, native grassland is extremely limited and is characterized as valley needlegrass and valley and foothill needlegrass. Existing patches are too small to be mapped at the scale used for the HMP vegetation data base.

2. Non-Native Grassland

Non-native grassland is characterized by non-native grasses such as wild oats (*Avena* spp.), bromes (*Bromus* spp.), and others (e.g., *Gastridium ventricosum*, *Vulpia* spp.). Other species present in this habitat type include invasive natives such as telegraph weed (*Heterotheca grandiflora*), fascicled tarweed, doveweed (*Eremocarpus setigerus*), and weedy introduced species such as Russian-thistle (*Salsola tragus*), black mustard (*Brassica nigra*), and tocalote (*Centaurea melitensis*).

Non-native grassland is not considered a sensitive habitat; however, in a few locations it may be a significant resource for raptor foraging, may support sensitive plant species, and may serve as a habitat linkage.

B. Coastal Sage Scrub

Coastal sage scrub types within Carlsbad include maritime succulent scrub, Diegan coastal sage scrub, and coastal sage scrub-chaparral scrub. Approximately 3,315 acres of coastal sage scrub exist within the City.

1. Maritime Succulent Scrub

Maritime succulent scrub includes a variety of succulents, such as fish-hook cactus (*Mammillaria dioica*), coast cholla (*Opuntia prolifera*), shore cactus (*Opuntia littoralis*), California desert thorn (*Lycium californicum*), cliff-spurge (*Euphorbia misera*), bladder-pod (*Cleome isomeris*), and several species of dudleya (*Dudleya* spp.), mixed with typical Diegan sage scrub species.

Under California regulations and policies, maritime succulent scrub is considered a sensitive habitat.

This habitat also has regional significance in that all mapped maritime succulent scrub in northern San Diego County occurs in Carlsbad.

2. Diegan Coastal Sage Scrub

Diegan coastal sage scrub is a drought-deciduous community comprised of aromatic shrubs and subshrubs with a diverse understory of annual and perennial herbs, perennial and annual grasses, and grass-like plants. It occurs primarily on dry south-facing slopes and hillsides or on clay-rich soils adjacent to chaparral or upslope from riparian woodlands. Characteristic species include coastal sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), lemonadeberry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), and purple needlegrass (*Stipa pulchra*). It also supports a variety of sensitive plant species, including California adolphia (*Adolphia californica*), ashy spike-moss (*Selaginella cinerascens*), Del Mar mesa sand-aster (*Corethrogyne filaginifolia*), and several others.

Under California regulations and policies, Diegan coastal sage scrub is considered a sensitive habitat; it is given the highest inventory priority in the CNDDDB.

In Carlsbad, the largest remaining tracts of Diegan coastal sage scrub are found in the vicinity of Lake Calavera, southeast of Agua Hedionda Lagoon, and near Rancho Santa Fe Road.

3. Coastal Sage Scrub-Chaparral Scrub

Coastal sage scrub-chaparral scrub is a transitional community between coastal sage scrub and chaparral types. Within the context of the North County Multiple Habitat Conservation Program (MHCP), it is categorized as a sub-type of coastal sage scrub and is considered a sensitive habitat. It is found primarily in Zone 16.

C. Chaparral

Chaparral habitat in the City has been grouped into two categories: undifferentiated (including southern mixed and chamise chaparral) and southern maritime chaparral. There are approximately 989 acres of undifferentiated chaparral in Carlsbad. Approximately 392 acres are mapped as southern maritime chaparral, although this number could change as a result of site-specific surveys.

1. Southern Mixed and Chamise Chaparral

Southern mixed chaparral is a fire- and drought-adapted community composed of a variety of woody shrubs, many of which are "stump sprouters" that regenerate rapidly from underground undamaged tissues following fires or other ecological perturbation. It is a heterogeneous community type (i.e., the dominant shrubs vary from site to site). In most situations the dominants include chamise (*Adenostoma fasciculatum*), Nuttall's scrub oak (*Quercus dumosa*), mission manzanita (*Xylococcus bicolor*), laurel sumac, lemonadeberry, and toyon (*Heteromeles arbutifolia*). Understory plants include rush-rose (*Helianthemum scoparium*), deerweed (*Lotus scoparius*), wreathplant (*Stephanomeria* spp.), and a variety of aster and daisy relatives (*Asteraceae*). Chamise chaparral is a community where chamise is the overwhelming dominant plant. Chamise may account for over 90 percent of the relative cover. The remaining species include shrubs and understory plants common in other types of chaparral.

As types, southern mixed and chamise chaparral are not sensitive habitats. However, raptors and other sensitive species are known to use these types.

These chaparral types have a patchy distribution throughout the City, occurring on more mesic north- and west-facing slopes, alternating with coastal sage scrub, grasslands, and oak woodlands.

2. Southern Maritime Chaparral

Southern maritime chaparral is similar to southern mixed chaparral but occurs on sandstone. It is the most limited chaparral type in distribution, particularly in Carlsbad, and is characterized by several endemic shrubs, including Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), wart-stemmed ceanothus (*Ceanothus verrucosus*), coast spice bush (*Cneoridium dumosum*), and Nuttall's scrub oak. Other dominant shrubs encountered in this community are the same as those listed above for southern mixed chaparral. Sensitive plant species associated with this type include wart-stemmed ceanothus, summer-holly (*Comarostaphylis diversifolia* var. *diversifolia*), Del Mar manzanita, ashy spike-moss, and western dichondra (*Dichondra occidentalis*).

Under California regulations and policies, southern maritime chaparral is considered a sensitive habitat by the CDFG.

In Carlsbad, the major stands of southern maritime chaparral are located: northeast of the junction of Palomar Airport Road and El Camino Real; east and west of El Camino Real between Palomar Airport Road and Alga Road; slopes above Green Valley; and east and west of El Camino Real between La Costa Avenue and Olivenhain Road.

D. Woodland

Two woodland types occur in the City: oak woodland and eucalyptus woodland. There are approximately 29 acres of oak woodland and 257 acres of eucalyptus woodland in Carlsbad.

1. Oak Woodland

Oak woodland, as discussed here, is dominated by coast live oak, with scattered individuals of other tree species.

2. Eucalyptus Woodland

Eucalyptus woodland is a non-native community. It is dominated by various species of planted eucalyptus (*Eucalyptus* spp.) that survived around old dwellings or in entire groves (e.g., the Hosp Grove). The understory is usually poorly developed or absent owing to the allelopathic (toxic) effect of eucalyptus leaves that acts to inhibit the growth of other plants. Although this habitat supports no sensitive plant or wildlife species, it is often used for nesting by raptors and other birds or roosting by bats.

E. Riparian

Riparian types within the City include riparian scrub, riparian woodland, and riparian forest. Riparian habitats are considered sensitive under federal and state regulations and policies. There are approximately 572 acres of riparian habitat in Carlsbad.

1. Riparian Scrub

As used herein, "riparian scrub" includes several natural and semi-disturbed wetland communities, including mule fat scrub, southern willow scrub, and baccharis/tamarisk scrub. These communities occur along river courses and seasonally moist drainages. In Carlsbad, some riparian scrub communities also are the result of urban or agricultural run-off. Riparian scrub typically is dominated by willows (*Salix* spp.) and Fremont cottonwood (*Populus fremontii*), or by mule fat (*Baccharis salicifolia*), broom baccharis, or tamarisk (*Tamarix* sp.), an introduced species. The understory is variable depending upon canopy coverage, disturbance history and water availability, and usually includes poison-oak (*Toxicodendron diversilobum*), desert grape (*Vitis girdiana*), western ragweed (*Ambrosia psilostachya*), rushes (*Juncus* spp.), and a variety of other hydrophytic (wetland) species.

Characteristic areas of riparian scrub occur: along El Camino Real south of Batiquitos Lagoon; extending east from the mudflats at the eastern end of Agua Hedionda Lagoon (e.g., Macario Canyon); and along the northern portion of the City south of Highway 78 in Buena Vista Creek.

2. Riparian Woodland

As used herein, "riparian woodland" includes sycamore-alder riparian woodland and other riparian woodland. Sycamore-alder woodland is an open to moderately closed, winter-deciduous, broadleaved riparian woodland, dominated by well-spaced western sycamore (*Plantanus racemosa*). The community typically includes individuals of several other tree species, including willow, coast live oak (*Quercus agrifolia*) Mexican elderberry (*Sambucus mexicana*), and Fremont cottonwood. This community occurs in broad channels of intermittent streams, usually with a cobbly substrate.

Sycamore-alder woodland is uncommon, occurring primarily in the Sunny Creek area and along a narrow drainage south of Lake Calavera.

3. Riparian Forest

Riparian forest, as discussed here, includes southern coast live oak riparian forest. This type is dominated by coast live oak, with scattered individuals of other tree species, such as western sycamore, willow, and Mexican elderberry. The understory includes toyon, laurel sumac, California wild rose (*Rosa californica*), poison-oak, and currant (*Ribes* spp.).

F. Marsh

Marsh and wetland habitats in Carlsbad include southern coastal Salt Marsh, freshwater marsh, the unvegetated mud flats and open water areas of estuaries, and several other aquatic habitat types. All marsh habitats are considered sensitive and are regulated under federal and state regulations and policies. There are approximately 1,466 acres of marsh habitats within the City.

1. Southern Coastal Salt Marsh

Southern coastal Salt Marsh is a wetland community that develops in low, flat estuaries at the mouths of rivers and streams. Tidal inundation or excessive evaporation results in highly saline conditions around the margins of lagoons, and it is under these conditions that Salt Marshes develop. This community is characterized by low-growing succulents such as pickleweed (*Salicornia* spp.), salty-Susan (*Jaumea carnosa*), salt-cedar (*Monanthochloe littoralis*), and other halophytic (salt-tolerant) species.

Within Carlsbad, Salt Marsh habitat is present surrounding portions of Batiquitos Lagoon and Agua Hedionda Lagoon. The habitat type also occurs in limited amounts around Buena Vista Lagoon. Several researchers have described distinct zones within southern coastal Salt Marsh (e.g., Zedler 1982).

2. Freshwater Marsh

Freshwater marsh occurs in drainages, seepages, and other perennially moist low places. This community is characterized by perennial, emergent monocots 2-3 m (6-10 feet) tall, such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.). Understory species include curly dock (*Rumex crispus*), Salt Marsh fleabane (*Pluchea odorata*), and a variety of hydrophytic grasses and herbs. Sensitive plants frequently encountered in the vicinity of this community are spiny rush (*Juncus acutus leopoldii*) and San Diego Marsh-elder (*Iva hayesiana*).

Patches of this habitat are present at the upper ends of Buena Vista, Agua Hedionda, and Batiquitos lagoons, where a mixture of plants of salt and freshwater habitats is encountered. Smaller freshwater marshes grow around the perimeter of Lake Calavera and within riparian scrub communities.

G. Other Wetland and Aquatic Types

Other wetland and aquatic types include disturbed wetland, estuaries, freshwater/open water, vernal pools and cismontane alkali marsh.

1. Disturbed Wetland

Disturbed wetland is not a native plant community. It typically occurs where the natural wetland vegetation has been degraded by mechanical activities or invaded by weedy, non-native species. This habitat is characterized by open and patchy vegetation that includes both native and introduced species. The dominant shrubs include mule fat, broom baccharis, and scattered willow trees. Other species present in varying density include coastal goldenbush (*Isocoma menziesii*), curly dock, castor-bean (*Ricinus communis*), cockle-bur (*Xanthium strumarium*), spiny rush, and pampas grass (*Cortaderia* spp.).

2. Estuaries

Estuarine habitat consists of a semi-enclosed body of water that has a free connection with the open ocean and within which seawater is measurably diluted with fresh water derived from land drainage.

3. Freshwater/Open Water

This aquatic habitat lacks vascular vegetation and includes lakes, ponds, and reservoirs. The area surrounding the open water is almost always characterized by freshwater marsh, Salt Marsh, or riparian habitats. Excluding the three major coastal lagoons (Baticuitos, Agua Hedionda, and Buena Vista), the largest open water area in the City is Lake Calavera. There also are a number of smaller natural or artificial ponds throughout the City.

4. Vernal Pools

Vernal pools are a highly restricted, unique wetland habitat type that contains high numbers of endangered, sensitive, and endemic plant and animal species. This type occurs in several scattered locations throughout the City on marine terraces. The most prominent occurrences of vernal pools are in Zone 22 along the railroad tracks and in Zone 21.

5. Cismontane Alkali Marsh

Areas in Carlsbad classified as cismontane or alkali marsh are typically disturbed riparian freshwater marsh that have changed in vegetative character due to agriculture or other disturbance. Plant species found in these locations are often those associated with saltmarsh, as well as exotic or weedy species. Areas of cismontane alkali marsh are located in Zone 11 along portions of Encinitas Creek and in Zone 15 in the vicinity of natural springs and seeps.